Fashioning Bygone Fashions

Creating Digital Sewing Patterns from Historic Garments

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Abstract

This paper explores options for creating digital sewing patterns from garments in historical costume collections. Such patterns provide independent scholars and the general public greater access to study historically accurate reproductions, sewing techniques, and the evolution of garment history. Three garments dating to the first half of the 19th century are examined studied and a open-source patterning solution is used to create sewing patterns of the aforementioned garments. A concise history of the creation and acquisition of these garments is included This exploration focuses on the resource conscious creation and use of digital sewing patterns to further the study and use of historic garments so as to appeal to small or individual collections, as well as to more well funded institutions.

Keywords: material culture, sewing patterns, historic garments, open-source software, digital pattern generation, William Czar Bradly, Westminster, Vermont, Seamly2D.

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Introduction

Clothing among is the most intimate set of belongings an individual can leave behind when they die. It reflects their personality, their likes and dislikes, how they lived and the work they did, and the space they held in society. It can retain their smell, how their body sweated, and if they bore children. Ones clothing is present at every moment, next to the skin, supporting the body and working to keep it from the ravishes of the environment. After death, a person's political and physical story can be read in their clothing. Indeed for most of human history, textiles were among the most costly and cherished worldly goods a person carried throughout their life.

Historic costume collections have the responsibility of caring for and curating these stories, preserving the remarkable and the mundane, so that we as a society can learn from our predecessors. However, those stories are often only read by a small collection of experts in fashion history or textile preservation. Due to the fragile nature of textiles cultural institutions are often cautious and tentative when allowing researchers to handle existent garments. The rise of digital collections has enabled many garments to be displayed with a minimum of damaging conditions. Yet for all the potential benefits of digital reproductions, certain aspects of clothing can never be addressed in a digital setting. Properties of texture, weight, movement, and wear are difficult and sometimes impossible to convey in a digital or museum exhibition context. To really get a feel for the form and function of a piece of clothing it must be displayed on the human body and in a setting where it can be handled in order to place the garment in its proper historical context. In this way living history interpreters are

essential to the practice of history and expanding our understanding of the past. Using accurate reproduction garments the public can view, touch, and even wear clothing of the past while the originals remain safely in the conservatorship of a museum or other cultural center.

As the relationship between museum professionals and living historians has not always been smooth, this paper seeks to increase collaboration between these two communities by expanding digital apparel collections to include sewing patterns. Museum professionals strive to protect and preserve fragile textile collections while displaying them for the enjoyment and education they provide to the public. Living history scholars seek to engage with the public by recreating and embodying these garments. It is believed that increasing access to a broader range of sewing patterns generated digitally from historic garments will enable higher quality re-creations and increase communication and collaboration with living historians and museum curators.

Accurate re-creations can better acquaint the public with the garments, while safely preserving the original objects. Recreations can be generated to represent a garment in the context of their own time, as well as a duplication of the condition a garment at the time of recreation. Additionally the collection of data needed to produce a reproduction can provide historians with practical information regarding the materials and methods used in constructing garments as well as how those techniques evolved and responded to textile innovation. Further, living historians can provide feedback on how the garments wear and why certain construction and design elements might have

been chosen by the creators. This type of collaboration will provide greater understanding of the context in which these garments were made and used.

This research will also enable a broader range of historical interpretation. With sewing patterns and data from garments belonging to marginalized people, often some of the most fragile, living historians will be able to create a more accurate and diverse sampling of historic communities. Increasing the diversity of living history events will also provide the public with a multidimensional understanding of the past and how our societies evolved, telling the stories of individuals long overlooked in more traditional accounts of history.

Research Design

This paper sets out to discover a resource conscious way to digitally capture and share the digital sewing patterns of an original historic garment which contain all the information needed to replicate the original garment. The author has examined several technologies to develop sewing patterns from existing garments, explored ways to disseminate those patterns, and modeled ways in which sewing patterns and reproduction garments can be used to generate increased interest in small costume collections.

A review of pertinent scholarly literature was conducted on the state of current costume collections, digital patterning tools, and digital modeling applications. Digital models here refer to three dimensional digital representation of the three dimensional object including material, construction, and support garments. Digital patterns, for the purposes of this paper, are defined as two dimensional representations used to construct three dimensional reproductions of historical costumes.

Once a set of technologies was selected, the author conducted a case study using three historic garments found in the William Czar Bradley Law Office[1] in Westminster, Vermont, and which now reside in the author's private collection. A short biography of the garments and how they came to the author has been included. This was to help demonstrate the ways a small historical society or private collector can add to the practice of textile history. For the creation of digital patterns the author selected

[1] http://www.westminstervthistory.org/bradley-law-office/ - retrieved December 2019

Seamly2D[2], version 0.6.0.1, an open source application developed by the Fashion Freedom Initiative[3]. Measurements were recorded by hand, entered manually, and all patterns were saved as tiled PDFs.

A series of open interviews with museum personnel has also been conducted to judge the relative state of current costume collections. Beyond this review of their current collection, these interviews helped document the attitudes of museum professionals towards the drafting digital sewing patterns and providing broad access to said patterns. Additionally, the interviews served to generate ideas for how sewing patterns, recreated garments and costumed interpreters can enhance their exhibits.

[2] Downloaded September 2019 at https://seamly.net/
[3] https://fashionfreedom.eu/ - retrieved December 2019

Literature Review

Current scholarship regarding digital apparel collections has focused on designing new applications for digitizing garments for the purpose of creating useful and engaging digital exhibits. Many of these new applications involve developing essentially digital sewing patterns which are then "stitched" onto a digital model. As these technologies improve, this final model becomes more and more life-like.

Developments in digital fashion modeling

In 2009, Clare Sauro of the Drexel Historic Costume Collection wrote about how advancements in 3D modeling have allowed museums to broaden their digital costume collections. In her paper *Digitized Historic Costume Collections: Inspiring the Future While Preserving the Past*[4] she illustrates how the Digital Dress Project, the Drexel Digital Museum Project, and other educational and cultural centers have been able to develop digital exhibitions and what benefits they are to the practice of conservation.

Crucially, she describes the democratizing nature of digital costume collections and how they enable a broader research community to allow educational and cultural centers to "remain true to their original educational missions". She also outlines key features needed to produce a high quality digital exhibit.

> "The best sites allow the user to search a database for information, offer access to high-quality images, and put forward some interactive aspect[s] such as free downloads and social tagging." (Sauro, 2009, pp. 1940)

While some of her language here is a bit dated, the cases she cites describe very useful interactive aspects. For example the Costume Institute of the Metropolitan Art

[4](Sauro, 2009, pp. 1939–1941)

Museum (MET) offers brief catalog information, thematic exhibitions, curatorial video talks while the"*Heilbrunn Timeline of Art History* which supplies thematic essays and object selections"(Sauro, 2009, p. 1940). Today the MET's costume site has expanded and provides some of the most user friendly search options.

The Victoria and Albert Museum, as mentioned by Sauro, offers a "searchable database with the option to order higher resolution images… thematic pages relating to current and past exhibitions… e-cards, free downloadable sewing patterns inspired by the exhibitions objects". A recent visit to their site found a significant number of higher quality and a larger quantity of images have been added, the e-cards and sewing patterns could not be found.

Another interesting and innovative approach illustrated by Sauro is the social tagging structure implemented by the Powerhouse Museum[5] in Australia. They have allowed user generated tagging to connect objects in their collection, organically forming subject headings which the user can then browse. This user based curatorial approach has generated the spin-off site: the Australian Dress Register[6]. Through this site users can enter their own objects into a national database, users can explore the collection using a remarkably detailed browse[7] function or the inventive timeline[8] feature.

This highly informative paper goes on to describe numerous digital collections held by educational institutions, most notably the Drexel Digital Museum Project. At the

[5] https://maas.museum/powerhouse-museum/ - retrieved December 2019
[6] https://australiandressregister.org/ - retrieved December 2019
[7] https://australiandressregister.org/browse/ - retrieved December 2019
[8] https://australiandressregister.org/timeline/ - retrieved December 2019

time Sauro was writing her paper, this Project was marked by its use of high image quality and its "virtual runway", which allowed users to view garments in a rotating loop. The Project has grown and now includes a kind of prototype 3D interactive media called OBJECTVR. OBJECTVR uses high quality images which "may be displayed at up to 3 times life size and re-purposed as HTML5 to display on the world wide web. Rich metadata descriptions, mapped to current standards of archiving, of these media ensure their persistent discovery, access and conservation."[9]

Sauro closes her paper by acknowledging that while all digital collections hold promise for broad dissemination and solutions to conservation concerns, there are significant drawbacks. Digitizing costume collections remains time consuming and can be very costly, posing barriers to many historic collections which are all to often understaffed and underfunded.(Sauro, 2009, p. 1941)

In a 2013 paper, *Motion and Embodiment: 3D Simulations for Historic Fashion*, Kathi Martin and Dave Mauriello chronicle their work at Drexel University using the Digital Clothing Suite (DCS). This program, developed at the Digital Clothing Center at Seoul National University, was used to create 3D simulations of fashion pieces. For this project they selected a 1930's dress from their collection. At the time of writing the DCS was unable to interpret complex underpinnings of earlier garments.

To begin the creation of a digital model, measurements were taken from the historic garment and used to generate a template panels. Then a textile surface and embellishment details were rendered in DCS onto the panels, using additional

[9] http://digimuse.westphal.drexel.edu/ddm/ - retrieved December 2019

parameters such as the tensile stiffness and density of the material used to construct the original garment. These were then draped onto a simulated body customized for this project. Seams between the panels were closed and the fully clothed model is depicted. Maya[10], a 3D computer animation, modeling, simulation, and rendering software, was then used to enhance the realism of the model's motions, fabric, skin, and hair. The model was placed in a simulated historically accurate setting based on holdings in the Winterthur Museum.

In a another article 2013, Digital Production of Traditional Costumes discussed digital pattern generation in conjunction with digital costume modeling using DCS and Maya, *Digital Production of Traditional Costumes*[11] . In this article the authors, by Yeonkyung Kang, Young-A Ko, Sehee Wu, Kathi Martin, and Hyeong-Seok Ko (Kang et al.), were seeking to "determine the feasibility of reproducing traditional costumes using digital technology". They selected two 18th-century ensembles, which were then analyzed for design features of the silhouette, fabrics used, and historically appropriate hair styling and accessories. The Maya application was used to construct a three dimensional digital bodies, a process complicated by the need for supportive undergarments on one of the ensambles. A panier-shaped object was attached to the waist of one of the bodies to enable the historic garment pieces to fit appropriately.

These bodies were then imported into DCS and the virtual sewing was carried out. Some of the construction techniques used in the original garments were converted to simpler methods in the digital model, while retaining the volume and general

[10] https://www.autodesk.com/products/maya/overview - retrieved December 2019
[11](Kang, Wu, Ko, Martin, & Ko, 2013, pp. 239–242)

appearance of the original. Textiles and textures of the materials were then replicated using bump mapping and other state-of-the-art computer graphics techniques. Finally historic hairstyles and accessories were added and the 3D digital model was complete.

Overall the project was deemed a success as "the technology allowed [them] to create a much more dramatic effect than general on-site exhibitions"[12], offering diverse viewpoints which were helpful to understanding the construction and feel of the original. However, limitations were encountered as the software did not contain simulations of all construction techniques used in the original, the hand of some of the fabrics was not duplicated accurately, and some of the virtual sewing process created puckering not seen on the original.

While all of these papers lay out the advantages of digital patterning and 3D modeling, the limitations encountered by the Korean researchers, Sauro, and Martin and Mauriello persist. The author of this paper believes these can be solved by using physical materials to create reproduction garments. Adding digital sewing patterns to 3D models would enhance the value of these models while easily disseminating the information to create high quality reproductions to address the limitations of digital models.

[12] (Kang et al. 2013, p.241)

3D Models vs. Physical Reproductions

Roz McNulty describes some of the most recent developments in digital modeling and pattern generation during a lecture[13] at Electronic Visualization and the Arts 2019 conference, held in London, UK this past July. She demonstrates the "potential for further documenting historic clothing" using 3D apparel industry software with examples that she and others created with these tools. In particular she highlights what can be accomplished using 3D scanning iPad applications, the Occipital camera, and Eyexpo software.

She points out that museums are striving to create more interactive exhibits but are limited by the physical restraints of their exhibition halls in displaying large portions of their collections. She quotes Dr. Christopher Breward, director of collections and research at the National Galleries of Scotland, explaining in an earlier symposium that less than 3% of their collection is visible at a given time, and the remaining 97% is heavily booked for access. McNulty reiterates that this is a common pattern in historic costume collections and that 2D images online can help. She then urges curators to look into 3D solutions to expand those digital collections.

McNulty describes the enjoyment she feels exploring digital collections at the Costume Institute at the MET, the Museum of Fashion Institute of Technology (FIT), National Museum of American History, Clothing and Accessories, Victoria and Albert Museum, the Drexel Digital Museum, Kyoto Costume Institute Digital Archive, Texas Fashion Collection Digital Library, and Wayne State University Digital Dress Library.

[13] https://www.youtube.com/watch?v=zGJ5IJmXXUo - retrieved December 2019

However these excellent collections still left her feeling "cheated out of how a garment really looks or works." Like many interested in historic fashion she "wants to comprehend the construction, the pattern lines, and the fabric detail; how that fabric would move."

She adds that interactive digital fashion museums are amazing and bring a "growing collection of essays, immersive 360 experiences, catalogues and links". For prime examples of this she cites several projects. First, Google's *We Wear Culture*, which combines the collections of over 180 cultural centers. In addition, both *Valentino Garavani Virtual Museum* and *Christies Virtual Tour: Catherine Deneuve et Yves Saint-Laurent* were mentioned, as both use 2D images to create a 3D experience. Yet even these immersive environments leave her asking "What does the back of that dress look like?"[14]

Later in the lecture she lists several 3D apparel software companies with applications that allow the designer "to draft in 2D, then drape or sew over a 3D avatar [or] personalised body scan." Designers can then add fabric, color, detail, and embellishments to their garments. Specifically she describes working with the CLO 3D software, an application that requires only basic knowledge of pattern drafting and computer skills. However with a subscription fee of $500 US per year, the author of this paper feels that this may not be a viable option for many small collections.

Next she continues her talk by describing a method of 3D modeling which bypasses digital pattern generation altogether. Using the Eyexpo scanner and software

[14] (McNulty, 2019, p. 241)

package she can scan a 3D object with an iPad and Occipital camera. The process takes between 5 and 10 minutes and results in “file formats suitable for 3D printing or further rendering in 3D graphics software.” This method differs from previous methods described in that is generates a visual representation of a 3D surface versus a 2D pattern projected onto a 3D model. She ends her talk by mentioning some of the ways augmented reality are being used in display and retail environments.

Yet our technologies still fail to activate senses such as touch, taste, and smell. Senses which a large portion of humanity rely on to navigate the world. This is perhaps truest regarding members of the public least capable of experiencing traditional physical and digital exhibits. Physical re-creations help to build a bridge to those communities, particularly when thoughtful attention is paid to historic traumas, neurodiversity, and disability inclusion.

Stephen Gapps makes a passionate argument for the inclusion of physical reproductions in his 2009 paper, *Mobile monuments: A view of historical reenactment and authenticity from inside the costume cupboard of history*. Gapps begins this paper discussing the role living historians and interpreters have defined for themselves and the role authenticity plays in their view of the practice of living history. Authenticity, he says, can act as both currency and fetishtized ideal but concludes that for the majority of “reenactors” true authenticity stands as an aspiration that can never be fully achieved.

As reenactors, each individual or group, must address how far they will reach in attempting to accurately and authentically portray history. Many elements needed to achieve this goal lie outside the control of an individual. Physical attributes of one's body

limit how well that individual can authentically portray a figure in the past. “We are all too healthy, too fat, and too old” [15] to portray the majority of our ancestors. Further ethical considerations need to be made when attempting to recreate history across racial or gender expressions, crossing these barriers can both illuminate modern blindspots and engender rage.

Gapps suggests that when endeavoring to remember horrific pasts “[t]he trauma…[of] historical relations resists representation - without some acknowledgement, some mourning, the past and the present fuse and the possibility of change is foreclosed. Thoughtful re-performances, rather than old minstrelsies, might well assist here.”[16] Earlier Gapps quotes a protestor, who objected to the performance of ‘slave auctions’ at Colonial Williamsburg, as saying after some consideration “Pain had a face, indignity had a body, suffering had tears”. For many living historians this reaction is the goal of their craft, to ask people to consider the role history plays in their lives and how historical events molded and formed the reality of today's society.

Gapps spends a great deal of time addressing how these interactions can be provoked through the practice of living history. Yet the thrust of his argument lies in the degree with which living historians can achieve an authentic representation of the past, a believable performance complete with stages, costumes, and props. To accomplish that feat, the reenactor must be able to create or access reproduction props. However many barriers remain in accessing the information needed to create authentic

[15] (Gapps, 2009, p. 401)
[16] (Gapps, 2009, p. 406)

re-creations. Gapps article serves to remind us what can be achieved through compassionate performance, accurate settings, and authentic costumes and props.

It is believed that by using tools such as those described by McNulty, Martin and Mauriello, Yeonkyung Kang, Young-A Ko, Sehee Wu, Kathi Martin, and Hyeong-Seok Ko, and Sauro to generate 2D patterns for their 3D models, we can also create 2D patterns that can be used by living historians and reenactors. These physical reproductions can then be incorporated into full sensory engagements and provide researchers and designer with a broader set of authentic fashion data.

Adding Value to Digital Costume Collections

As discussed in the previous section, cultural centers have been working with software to create 3D models of historic fashion objects for a number of years. Several of these projects relied on creating 2D sewing patterns for the generation of their 3D models. Additionally evidence was shown as to the value physical reconstructions can add to both digital and physical exhibits. Finally, the value of broadening the sensory impact of costume collections and reaching out to communities that do not use sight and sound as their primary experiential senses was shown.

With this information in mind, the author reached out to costume curators and other museum professionals regarding the organization, digitization, and use of their current costume collections. Several museums were contacted for information. Of those that responded, the author was able to sit down and discuss the research of this paper with Alden O'Brien from the Daughters of the American Revolution Museum (DAR), Kristina Haugland from the Philadelphia Museum of Art (PMA), and two members of the curatorial team, Alice Caggiano and Racheal Scott, at the Westminster Vermont Historical Society (WHS). The author was also able to reach out to other several other institutions via email interview. In addition to the current state of their collections, using the findings of the paper to update exhibitions, in regard to the addition of digital sewing patterns, recreated garments, and costumed interpreters, were discussed.

Meeting museums where they are and creating useful datasets

The author began by inquing which cataloging tools were used to create, manage, and store information on objects in their costume collections. DAR uses Proficio, which Ms. O'Brien disliked as the search function used on the website does not crawl all fields in the catalog and she finds the controlled vocabulary used with this software, Nomenclature 4.0[17], to be insufficient to fully describe the elements in her purview. Many taxonomic terms used in costuming communities are not included in Nomenclature 4.0 and the structure restricts natural language usages. She stated that she preferred previous system, Argus[18], which had expanded fields, hierarchical structure, and used an expandable international lexicon ICON. The Collections Management Department at the Victoria and Albert Museum (V&A) use CollectionsIndex+[19] to catalogue objects and rely on Aetopia Digital Asset Management Solutions[20] to manage all digital assets whether collections or representations of the collection. Jessica Glasscock, a research associated within The Costume Institute at the Metropolitan Museum of Art (MET) and Kristina Haugland, the Le Vine Associate Curator of Costume and Textiles and Supervising Curator for the Study Room at PMA, both stated that they use TMS Collections[21]. The MET also uses NetX[22] for digital asset management, while at the WHS PastPerfect[23] is used.

[17] (Bourcier, Dunn, Chenhall, & Taskforce, 2015)
[18] https://lucidea.com/argus/ - retrieved December 2019
[19] https://www.ssl.co.uk/collectionsindex - retrieved December 2019
[20] https://aetopia.co.uk/ - retrieved December 2019
[21] https://www.gallerysystems.com/products-and-services/tms-suite/tms/ - retrieved December 2019
[22] https://www.netx.net/ - retrieved December 2019
[23] https://www.museumsoftware.com/ - retrieved December 2019

When asked about controlled vocabularies used to standardize their object entries most responded that they were using Nomenclature 4.0 for museum cataloging, (Bourcier, Dunn, Chenhall, & Taskforce, 2015). All seemed satisfied with Nomenclature as a resource. However, as described above, Ms. O'Brien was quite critical of this program, finding it unintuitive and insufficient to meet her needs. The MET stated that they did use controlled vocabularies to standardize their object records but did not specify which ones were in current use or how well they were suited to its collections.

The author also asked what file formats were supported by the cataloging software in use at their museums. At the V&A, their cataloguing software only supports raster image formats[24] such as tiff and jpeg. Other formats are supported by Aetopia and any file can be stored within it. A wide range of these formats can support thumbnails created for use on the V&A website. The MET responded that their system supports jpg, pdf, and mov file formats.

When asked about how much of the data collected on an object is accessible to the public, the V&A responded that if the cataloging information is recorded, most of it is made available online. The information they do not display is that which may be sensitive or has some degree of confidentiality. For instance, they do not release valuation information or personal information relating to living people, nor would they present any images for which they did not have a copyright agreement stating that they

[24] Raster graphics are the most common type of image files. They are comprised of a grid of pixels where each pixel represents an individual color within the image. Both Web graphics and digital photos are stored as raster graphics. While some raster image formats are uncompressed, most use some type of image compression. https://fileinfo.com/filetypes/raster_image - retrieved December 2019

are allowed to put it online. Outside of this sensitive information, research on users, conducted by V&A's digital team, determines what information is presented online.

In stark contrast the WHS responded that none of their cataloging data is accessible on online. At the time of writing the curatorial team consisted of an all volunteer organization with three people who are actively involved in caring for the collection. This small staff is responsible for accessioning and cataloging all current and new donations.

The MET specified that certain information is required in their acquisitions and cataloguing process. That is the information typically added to TMS,and Object tombstones[25] from TMS are then drawn into the Collection Online. The author found that this system may be why the MET's broad online costume collection contains such a shallow amount of cataloging information.

What data is collected on a given object is determined at the V&A by a sector standard called SPECTRUM, which can be accessed through the Collections Trust website[26]. This is the baseline standard defines what data museums in the UK can record. This is then translated into their own collections information framework. The MET responded that they have specified information required in their acquisitions and cataloguing process. The cataloguing guidelines predate their digitization and have been subject to many internal reviews by curatorial staff over the years. At the WHS they collect as much data as possible on an object, given their resource constraints.

[25] an output format of the TMS Collections.
[26] https://collectionstrust.org.uk/spectrum/ - retrieved December 2019

Turning to more speculative questions, the author asked if the museums would consider adding digital sewing patterns to their online collections. The MET stated that they could not project what their future plans will be, but assured the author that such a project is not currently a priority in their data collection or online presence. The DAR responded that such efforts did not feel within the remit of a curator or museum, but had collaborated with others to develop the sewing patterns in the past, noting specifically that scaled patterns had been included in the catalog published for a recent exhibition, "An Agreeable Tyrant: Fashion After the Revolution"[27]. The WHS was very interested in the concept of digital sewing patterns in online records, but does not have any records online yet.

The author then tried to gauge how interested these museums would be in working with living historians and historic interpreters to recreate items in their collection and develop public outreach programs. The MET reiterated that they could not project what their future plans will be, but stated that they have had staff that recreate objects as necessary for installation purposes. This makes sense for a large, internationally renowned, and well funded museum. However when discussing the same issue with the WHS rendered a very different response. They asserted that they would be willing to collaborate with historic interpreters to to recreate objects in their collection. However such endeavors would entail permission from their board of trustees, interpreters would need to use museum guidelines for handling objects, and that the reproductions could only be used for educational purposes.

[27] (O'Brien et al., 2016)

Furthermore the WHS would also be very interested in any information generated by living historians and historic interpreters as they recreated and used such objects. They also expressed an interest in collaborating with historic interpreters to use recreated objects to increase interest in our online and physical exhibits and in developing tactile and video demonstrations with historic interpreters.

The author then wondered if these institutions would be interested in using recreated objects and/or historic interpreters to develop tactile exhibits geared toward visitors with sensory disabilities. The MET replied that they currently have museum education programs wherein they share materials produced by their installation team with visitors with sensory disabilities with a program is called Picture This[28]. When posed with the same query the WHS responded with a resounding "Yes"!

During the course of these interviews, it was made clear that large, well-funded institutions either did not see value in expending resources to generate digital sewing patterns and most questioned how much usage could be generated from such items. They also tended to be skeptical about the benefit they would see in collaborations with costumed interpreters or living historians. However smaller institutions found such concepts intriguing and worthy of pursuit as long as clear guidelines were followed regarding the handling of existent objects and use of recreated objects.

[28] https://www.metmuseum.org/events/programs/met-tours/met-tours-disabilities/picture-this - retrieved December 2019

Digitizing Paper Patterns already in costume collections

In the author's conversations with curators, it came to light that several organizations had in fact previously drafted several paper sewing patterns from garments in their costume collections. The majority of of these patterns were not disseminated to the public. Some had been drafted at the PMA and used to recreate garment for an off site installation. At the DAR, patterns had been taken by a few professional pattern drafters and were sold commercially, other patterns had been drafted by the curator herself and were used in physical publications.

Sarah Walton**,** a dress and textile technician specializing in conservation at Manchester City Galleries, had the most to say on the subject. She told the author that while currently they do not have garment patterns attached to any of their object records digitally, it could be made possible by attaching a printable pdf to the online record. She went on to mention that a few items in the collection have had paper-based patterns taken by various individuals and a few feature in fashion book patterns by Jannet Arnold. If an item is fragile, they may sometimes take a pattern of their own object during costume mounting to reduce handling. However the process of manually taking a physical pattern has its own handling issues. She felt that adding these to the records would be of interest to students and researchers, although may not be appropriate for contemporary pieces as the patterns may be protected by design rights.

The author found this news to be extremely interesting and is eager to explore further how such patterns could be developed into digital resources. Although not the

focus of her current project, she believes it to be a rich avenue for further study and something to pursue at a later date.

Case Study

For this project three garments were selected from the authors private research collection, a men's shirt, a women's shift, and a women's gown. These garments were then measured by hand and patterns were drafted using Seamly2D. The resulting patterns were then exported as tiled pdf files and can be found in the appendices of this paper.

Software Used

Seamly2D[29] was selected as the pattern drafting tool for this project. It was chosen from other similar products for its cost, active community of users, and flexibility. Seamly2D is an open-source pattern design software designed to function on Windows, Mac, and Ubuntu operating systems, so can easily be adapted to fit budgetary and computer system constraints. The software also contains additional features such as SeamlyME, which enable profiles to be created based on an individual's measurements, enabling simple customization for bespoke patterns. Measurements in Seamly2D can also be taken without SeamlyME and used to recreate a specific garment as was done in this study.

The author found the program simple to understand and with practice simple to use. Key sections of the manual, such as the orientation system and keyboard shortcuts, were particularly helpful. A basic grasp of three dimensional thinking, familiarity with

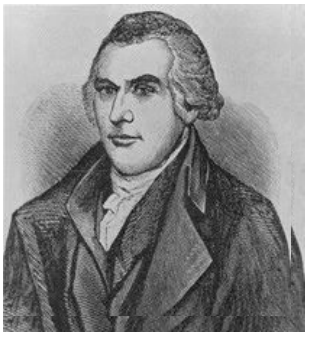
[29] https://seamly.net/ - retrieved December 2019

textile properties, and a little trigonometry are all one really needs to begin drafting patterns from existing garments using this software.

Garment History and Composition

These three garments were all found in the William Czar Bradley Law Office[30], described in local newspapers in 1998 as "like King Tut's tomb" by John Dumville, museum curator with the Vermont Division of Historic Preservation. The office was likely locked by Czar Bradley, 76, himself in 1858 and left virtually untouched until the deed finally passed to the State of Vermont in 1997. The small two room building was willed to the State of Vermont in 1908 by Czar Bradley's granddaughter, Sarah Bradley Willard. However the building remained in the Bradley-Willard family until the death of Sarah B. Willard's grandson, William Bradley Willard, in 1997[31].

Once reopened, various State of Vermont officials, elected leaders, and curious neighbors all rushed to view the contents of the historic little building which once served two of the brightest leading lights in Vermont's history. The Law Office was shared by Stephen Row Bradley[32] [33], who along with Mosses Robinson served as the first US Senators



[30] (Poli, 2014)
[31] (Vermont et al., n.d., vol. 108).
[32] ("BRADLEY, Stephen Row, (1754 - 1830)," n.d.)
[33] S. R. Bradley Image ("BRADLEY, Stephen Row, (1754 - 1830)," n.d.)

from Vermont, and his son William Czar Bradley[34] [35], a US Representative for Vermont's 1st district. The valuable books and papers "ended up at the University of Vermont" Dumville is quoted as saying in another local news article in 2014[36], the rest of the contents were eventually returned to the Westminster Historical Society[37].

During the summer of 2004, Alice Caggiano, Racheal Scott, Kathy Lisai, and Lisa Calcherra gathered on the back deck of Scott's house to sort through and photograph the clothing found in the office. Those deemed to be too damaged for the Westminster Historical Society to properly cared for were deaccession at this time[38]. Of those deaccessioned garments, those comprising of linen and cotton were cleaned by Racheal Scott and donated to the private research collection of her daughter, Sonia Scott.

After receiving the generous donation the author began examining the items and selected three to be used in this project. Those items are a shirt belonging to Jonathan Dorr Bradley (son of William Czar Bradley) likely dating to the 1820's, a woman's shift likely worn by women of the Bradley family during the first quarter of the 19th century, and a woman's gown again likely worn by the women of the Bradley family likely constructed during the 1820s or 1830s.

[34] W. Czar Bradley image https://www.findagrave.com/memorial/13590061/william-czar-bradley - reterieved December 2019
[35] ("BRADLEY, William Czar, (1782 - 1867)," n.d.)
[36] (Smallheer, 2014, pp. B4–B5)
[37] (Smallheer, 1998, p. 7)
[38] (A. Caggiano & R. Scott, personal communication, 2019)



Figures 1, 2, 3. JD Bradley Shirt, Ruffle Sleeve Shift, Gown with Pocket

The first two were selected for being the most intact of the available undergarments, allowing for equal gender representation, and while essentially simple garments both had interesting ruffled embellishments. The third garment, the gown, was selected for its complexity and the interesting detail of a sewn in pocket, a rare find on a gown of its age and style.

Measuring and Drafting

The garments were measured by hand and at first entered into a spreadsheet. However it soon became clear that this was an unnecessary and complicating step, and the measurements were then taken and entered into Seamly2D at the same time. By recording the resulting angles where seams met pattern pieces could be drafted during the measurement process. This served to speed the operation, and errors in measurement or calculation could be corrected on the fly. The author was immeasurably helped in this undertaking by the accurate and painstaking skills of Cole

Grinnell. While acting as a team the author recorded and drafted the patterns as Mr. Grinnell measured seams and calculated angles and curves. The process for the shirt and shift were quite simple, the only difficulty came in measuring the length of densely ruffled pieces. Each of these garments were completed in approximately eight hours work.

The gown on the other hand was much more complex. In addition to a larger number of pieces, the garment was fitted close to the upper torso and the resulting pattern pieces involved a much greater level of complexity. For these elements a working understanding of the geometry of curves and sewing darts came in very handy. A number of these elements also had to be extrapolated from the existing scraps of original material and knowledge of fashion design of the late Federal Period.

On the whole, Seamly2D worked very well for drafting these patterns. The only caveat encountered by the author was difficulty finding an efficient configuration of pattern pieces when porting them out of Seamly2D. This is done through the printing interface which does not allow for manual configuration of the pattern pieces.

Conclusion

Clothing has always been important to people. It warms us in the cold and shields us from the sun. Over thousands of generations we have developed garments to protect our bodies from the harshest environments on Earth and even among the stars. It is used as a form of expression to inform others of our wealth, culture, social status, political and religious affiliations, gender expression, and even sexual preferences. In many ways it can disclose information about ourselves that we may not be consciously aware of. Because of the revealing nature of the clothing we used to shield our bodies, it provides invaluable insight into the lives of people around us and to those who came before us.

However, clothing is not a persistent artefact. It can and is damaged, disposed of, and remade over time. Cultural centers are charged with the care of costume collections must diligently watch over their fragile artifacts while also providing access to researchers and historians seeking to understand how our societies and civilizations evolved. Digital technology can help play a role in balancing the need to conserve with the need to investigate, providing a method of preserving the details of these fragile objects and how they were made with minimal disturbance to objects themselves.

Currently, digitized sewing patterns are not featured in the expansive online exhibits of well funded institutions. But as discovered after reading relevant literature and performing interviews with small and medium sized institutions, there is interest in what opportunities may lie in the creation and dissemination of such patterns. Smaller

cultural centers appear less guarded and have more to gain by opening their collections up for such a purpose.

As described in the previous sections, many exciting technologies now exist for the capture and dissemination of information about historic costumes. We can create images and models that can mimic the color, texture, and movement of garment last worn hundreds of years ago. We can place those models in digital representations of bygone environments. We can even capture images of minute details that give us glimpses into how or why these garments were constructed.

As illustrated in this paper we can now easily create sewing patterns from historic garments. This leads to the tactile work of producing reproductions and learning from stitchers long dead new ways of piecing together the threads of our lives. Re-created clothing enables us to tactically understand how our ancestors felt as the dressed in the morning or suffered in bad weather. We can experience the shape of a garment without the use of our eyes. We can feel the crispness of sun dried linen or smell the lanolin musk of sheep in the folds of a wool cloak. Looking at the patterns, we can see the evolution of styles and trends and the effects of prosperity and poverty over time, leading us closer to the lives of our ancestors.

Bringing these digital patterns to broader audiences through the internet helps all participate in the exploration of the past. Ideally, a digital historic sewing pattern library could be developed. Allowing patrons to download available patterns, upload new ones, and share their re-creations with the community. It can add even more stories of the

people who wore these clothes before diversifies the collective process of history, and in its best use, allow us to see ourselves as part of the fabric of time.

Appendices

Resulting Patterns

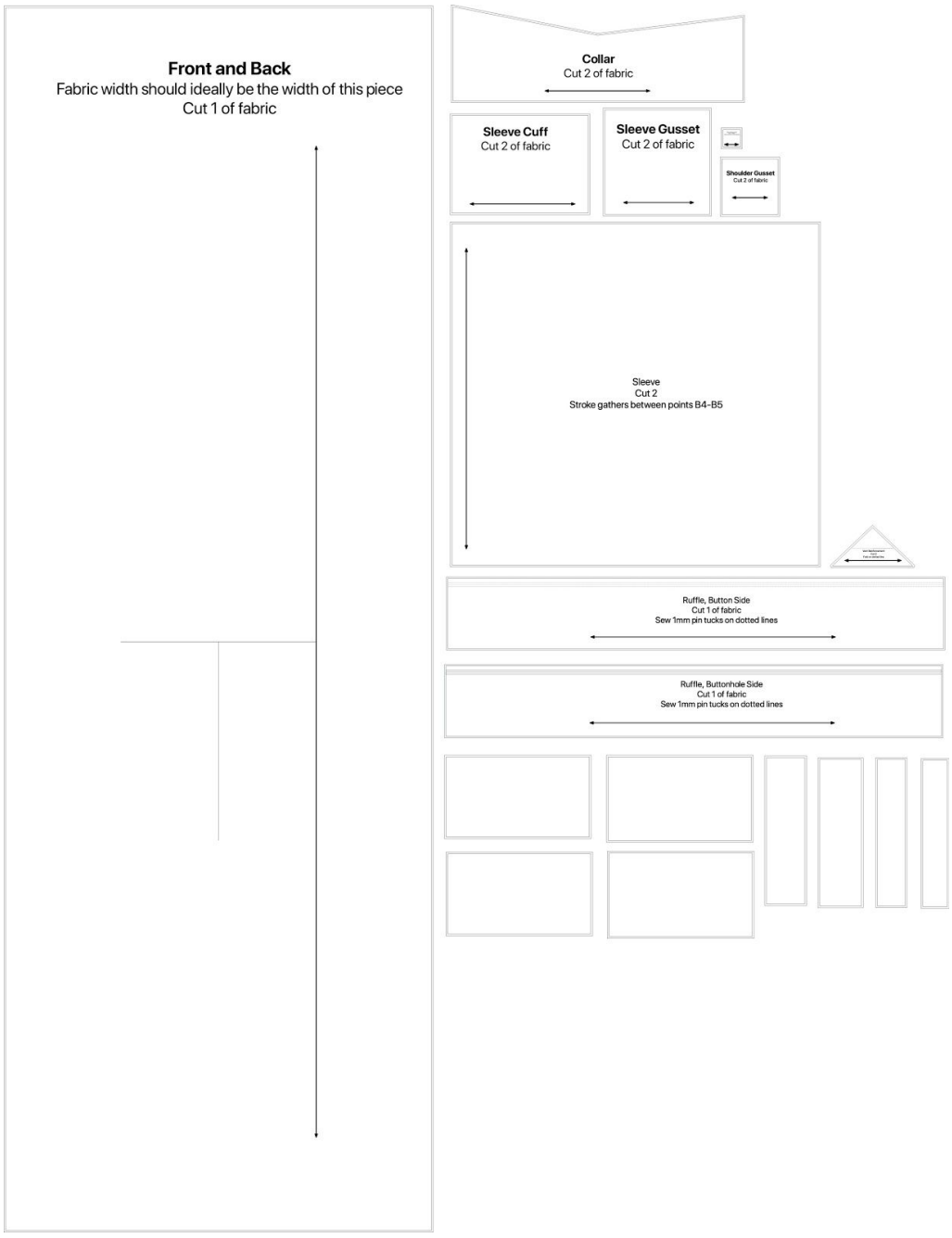


Figure 1A. Men's Shirt with Chest Ruffle

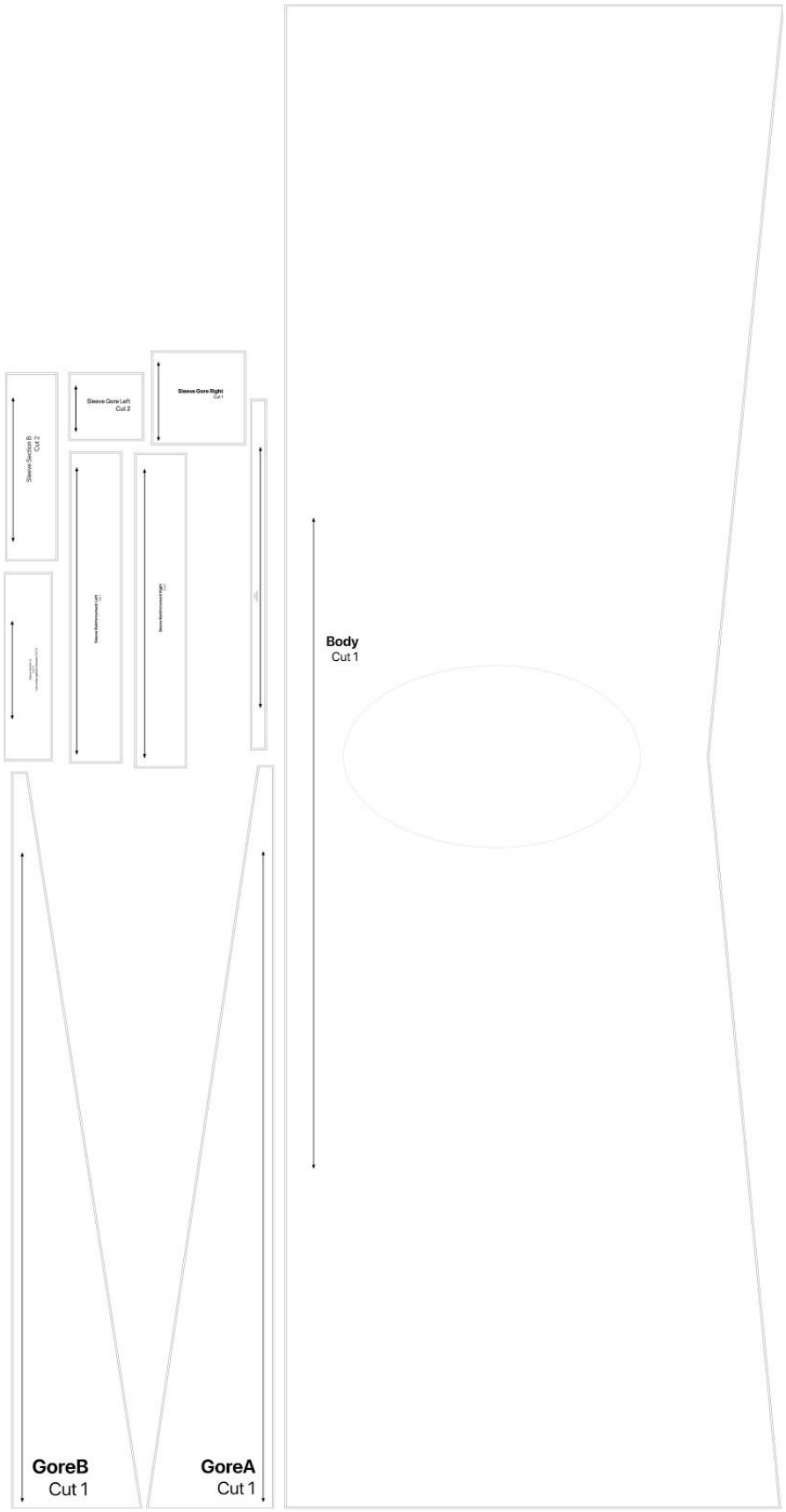


Figure 2A. Women's Shift with Ruffle on Sleeves

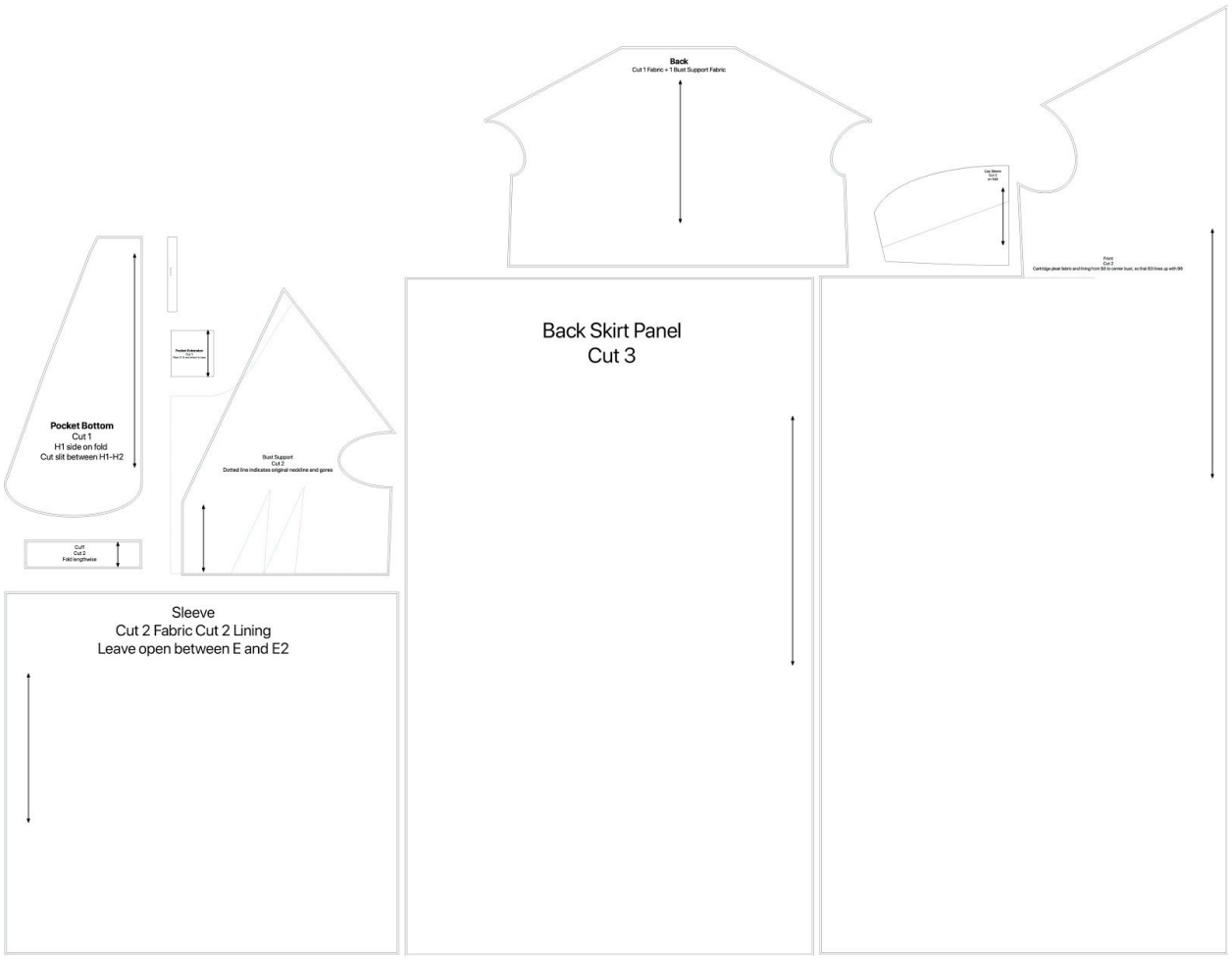


Figure 3A. Women's Gown with Pocket

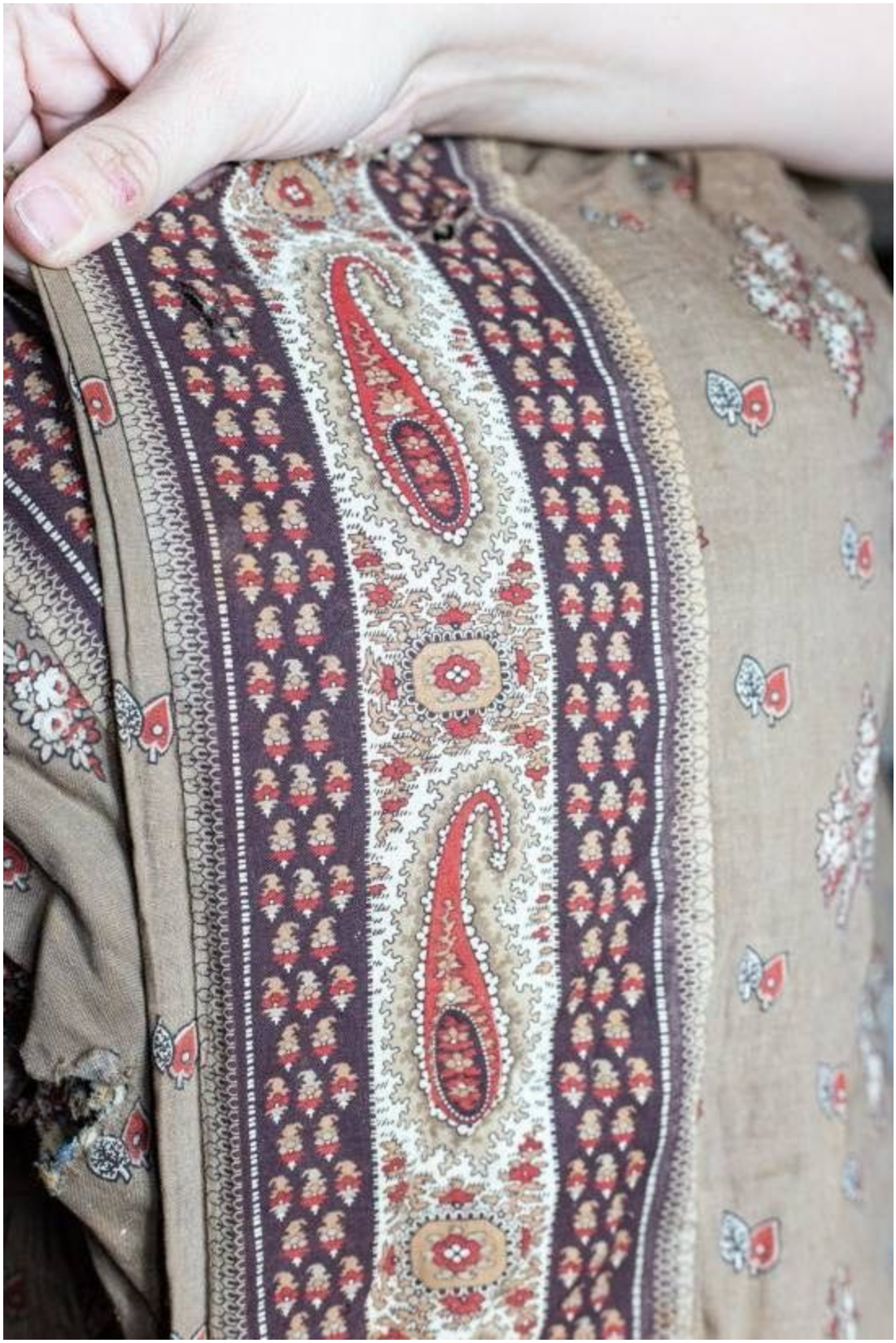
Original sized, printable, and tiled pdfs are included after the Acknowledgements section.

Additional Images

J. D. Bradley's Shirt

Ruffle Sleeve Shift

Women's Gown with Pocket




Fairloom


Fairloom


ADJUSTABLE DRESS
14 SECTIONS
Size Bust Adjusts

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